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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,940	02/11/2004	William L. Brenneman	102426-300	5347
27267	7590	11/04/2004		
WIGGIN AND DANA LLP ATTENTION: PATENT DOCKETING ONE CENTURY TOWER, P.O. BOX 1832 NEW HAVEN, CT 06508-1832			EXAMINER LAM, CATHY FONG FONG	
			ART UNIT	PAPER NUMBER
			1775	

DATE MAILED: 11/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/777,940

Applicant(s)

BRENNEMAN ET AL.

Examiner

Cathy Lam

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 15-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date May 24, 2004
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-14, drawn to a laser ablation resistant copper foil, classified in class 428, subclass 607.
 - II. Claims 15-20, drawn to a method for manufacturing a printed circuit board, classified in class 216, subclass 65.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by a different process such as by spray coating an anti-tarnish coating onto a copper foil, bonding the coated copper foil onto a dielectric substrate with the anti-tarnish coating facing the substrate. Applying heat and pressure to the copper foil and dielectric substrate. Applying a mask over the copper foil, acid etching the copper foil, the rinse the laminate with a basic solution. Remove the mask. The process as claimed can be used to make a different product such as a decorative artwork.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Atty: Gregory Rosenblatt on October 19th 2004 a provisional election was made with traverse to prosecute the invention of group

I, claims 1-14. Affirmation of this election must be made by applicant in replying to this Office action. Claims 15-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Objections

6. Claims 1 & 9 are objected to because of the following informalities: "FR-4" is vague and indefinite. Appropriate correction is required.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (US 5800930) in view of Yamanishi et al (US 5389446) or Ameen et al (US 6132589) or Poutasse III et al (US 5622782).

Chen discloses a chemically treated copper foil that is laminated to a dielectric substrate. The dielectric substrate is particularly glass filled epoxy board (col 1 L 20-21).

The copper foil includes a nodular copper/nickel alloy deposited onto the surface of the copper foil (col 2 L 8-10, L 32-34). The average height of the nodules is from about 0.5 μm - 3 μm (col 3 L 14-16).

A chromium/zinc anti-tarnish coating is then coated to the nodulated copper foil, then laminated to the dielectric substrate (col 5 L 53-57).

The peel strength between the treated copper foil and the dielectric substrate is 11.7 lbs/in (col 5 L 56-59).

Chen teaches the present invention but is silent about the average surface roughness of the treated copper foil being < 0.7 μm .

Yamanishi discloses a copper foil for printed circuit board. The copper foil is coated on its shiny side with a zinc and/or zinc oxide and chromium oxide (col 2 L 55-59).

Ameen discloses a treated copper foil comprising of a copper foil with a layer of zinc oxide and a layer of chromium oxide (col 2 L 16-20).

The copper foil has a smooth or shiny side and a rough or matte side. The zinc oxide and the chromium oxide layer can be applied to either side or both sides of the foil (col 2 L 50-54).

Poutasse also discloses a copper foil bonded to a dielectric substrate to form a printed circuit board. The dielectric substrate is a polymeric resin substrate, such as polyimide or epoxy resin (col 2 L 30-35).

The copper foil is treated with a metallic material such as chromium, chromium-zinc alloy, zinc and/or molybdenum (col 5 L 25-29). An adhesion promoting layer such

as silane compounds are coated onto the treated copper foil for bonding to the dielectric substrate (col 5 L 57-61). With the particularly silane adhesion promoting layer the peel strength increases above 4.5 lbs/in (col 10 L 5-9).

In view of the prior art teachings, one skill in the art would choose zinc, chromium and their oxides to coat onto a copper foil (either on shiny side of on rough side) and add a silane adhesion promoting layer to increase the peel strength because zinc/chromium oxides are well known anti-tarnish coating and silane is a well know coupling agent.


It is also obvious that a printed circuit board having a dielectric substrate with via holes because it is conventional to form via holes for electrical connections between dielectric layers in multilayer printed circuit board.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (571) 272-1538. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Cathy Lam
Primary Examiner
Art Unit 1775

cfl
November 1, 2004